Amendments to the Claims

Please cancel claims 1-40, 47-50, 52, 55 and 66-95, add new claims 96-164, and amend the remaining claims as follows:

1-40. (Canceled)

41. (Currently Amended) A method of making a patterned semiconductor film, comprising the steps of:

a) inkjet printing, gravure printing, printing by offset lithography, or flexographic printing a composition comprising a first cyclic Group IVA compound of the formula (1):

$$(AH_x)_n, \qquad (1)$$

where n is from 3 to 8 and each A in the formula is independently Si or Ge, and/or a second cyclic Group IVA compound of the formula (2):

$$(AH_x)_m(AH_yR_{z,y})_p(ZR')_q, \qquad (2)$$

where (m + p + q) is from 3 to 12, each of the m instances of x is independently 0, 1 or 2, each of the p instances of y is independently 0, 1 or 2, each of the p instances of z is independently 0, 1 or 2, each of the p instances of (y + z) is independently 1 or 2, each of the q instances of w is independently 0 or 1, at least one of p and q is at least 1, each A in the formula (2) is independently Si or Ge, Z is selected from the group consisting of B, P and As, R' is R or H, and each R in the formula (2) is independently alkyl, aryl, aralkyl, a halogen, $BH_sR''_{2-s}$, $PH_sR''_{2-s}$, $AsH_sR''_{2-s}$ or $AH_tR''_{3-t}$, where s is 0 to 2, t is 0 to 3, and R" is alkyl, aryl, aralkyl, a halogen, or AH_3, and a solvent in a pattern on a substrate; and

b) curing said printed composition to form said patterned semiconductor film, wherein curing said printed composition comprises irradiating said printed composition, and said patterned semiconductor film comprises an array of lines

having a width of from 100 nm to 100 μm, a length of from 1 μm to 5000 μm, and a thickness of from 0.01 μm to 1000 μm.

42. (Original) The method of Claim 41, wherein said composition further comprises semiconductor nanoparticles.

43. (Original) The method of Claim 42, wherein said semiconductor nanoparticles comprise passivated semiconductor nanoparticles.

44. (Original) The method of Claim 42, wherein said semiconductor nanoparticles comprise silicon nanoparticles.

45. (Original) The method of Claim 41, wherein said composition comprises both of said first and second cyclic Group IVA compounds.

46. (Original) The method of Claim 41, wherein said curing step comprises sintering said composition to form said patterned semiconductor film.

47. (Canceled)

48. (Canceled)

49. (Canceled)

50. (Canceled)

51. (Currently Amended) The method of Claim 41, wherein said printing step further comprises ~~the substeps of depositing a layer of said composition on said substrate,~~

selectively irradiating portions of said ~~layer~~printed composition, and removing either irradiated or non-irradiated portions of said ~~layer~~printed composition to form said pattern.

52. (Canceled)

53. (Original) The method of Claim 51, wherein said selectively irradiating substep comprises (i) positioning at least one of said substrate and a mask such that said portions can be selectively irradiated and said non-irradiated portions cannot be irradiated, and (ii) irradiating said layer with ultraviolet light through said mask.

54. (Original) The method of Claim 53, wherein said printing step further comprises the substep of aligning said mask to an alignment mark on said substrate.

55. (Canceled)

56. (Original) The method of Claim 41, wherein said printing step comprises inkjet printing said composition in said solvent in said pattern onto said substrate.

57. (Currently Amended) The method of Claim 41, wherein said printing step comprises ~~screen-printing,~~ gravure printing, offset lithography, or flexographic printing ~~or laser writing~~ said composition in said solvent in said pattern onto said substrate.

58. (Currently Amended) The method of Claim 41, ~~wherein said curing step comprises~~ further comprising drying said composition and said substrate.

59. (Currently Amended) The method of Claim [[42]]43, wherein said curing step further comprises heating said composition to a temperature of at least about 200 °C. to sinter said passivated semiconductor nanoparticles and said composition.

60. (Currently Amended) The method of Claim 41, wherein said curing step further comprises placing said substrate into a chamber, and evacuating said chamber.

61. (Original) The method of Claim 60, wherein said curing step further comprises passing an inert and/or reducing gas into said chamber.

62. (Currently Amended) The method of Claim 41, wherein said ~~pattern comprises a two-dimensional array of~~ lines ~~having~~ have a width of from ~~100 nm~~ 0.5 to ~~100~~ 50 μm.

63. (Original) The method of Claim 62, wherein said lines have an inter-line spacing of from 100 nm to 100 μm.

64. (Currently Amended) The method of Claim 62, wherein said lines have a length of from [[1]]2 μm to ~~5000~~ 2000 μm.

65. (Currently Amended) The method of Claim 62, wherein said lines have a thickness of from 0.01 μm to ~~1000~~ 500 μm.

66-95. (Canceled)

96. (New) The method of Claim 43, wherein said passivated semiconductor nanoparticles comprise silicon nanoparticles and a passivation layer thereon.

97. (New) The method of Claim 96, comprising wherein said passivation layer comprises at least one member selected from the group consisting of an alcohol, an alcoholate, a thiol and a thiolate.

98. (New) The method of Claim 96, wherein said passivation layer comprises hydrogen and/or halogen atoms.

99. (New) The method of Claim 96, wherein said passivation layer further comprises a surfactant.

100. (New) The method of Claim 43, wherein said passivated semiconductor nanoparticles have an average particle diameter of less than 5 nm.

101. (New) The method of Claim 43, wherein said passivated semiconductor nanoparticles have a particle size distribution of from 0.2 nm to less than 10 nm.

102. (New) The method of Claim 41, comprising the first cyclic Group IVA compound of the formula (1).

103. (New) The method of Claim 102, wherein each x in the formula (1) is 2.

104. (New) The method of Claim 102, wherein each A in the formula (1) is Si.

105. (New) The method of Claim 102, wherein n is 5.

106. (New) The method of Claim 103, wherein each A in the formula (1) is Si.

107. (New) The method of Claim 103, wherein n is 5.

108. (New) The method of Claim 106, wherein n is 5.

109. (New) The method of Claim 41, wherein the composition consists essentially of said first cyclic Group IVA compound and said solvent.

110. (New) The method of Claim 43, wherein the composition consists essentially of said passivated semiconductor nanoparticles, said first and/or second cyclic Group IVA compounds, and said solvent.

111. (New) The method of Claim 41, wherein the composition comprises said first and second cyclic Group IVA compounds, wherein p is 0 or 1, q is at least 1, (z - y) is 0, and Z is B or P.

112. (New) The method of Claim 111, wherein R' in the formula (2) is alkyl, aryl, or aralkyl.

113. (New) The method of Claim 41, further comprising a compound of the formula $(ZH_uR_{3-u})_k$, where Z is selected from the group consisting of B, P and As, u is an integer of from 0 to 3, k is 1 or 2, and R is the same as for the second cyclic Group IVA compound.

114. (New) The method of Claim 113, wherein R in the formula $(ZH_uR_{3-u})_k$ is H or AH_3, where A is the same as for the second cyclic Group IVA compound.

115. (New) The method of Claim 113, wherein u is 0 or 3.

116. (New) The method of Claim 41, wherein said first cyclic Group IVA compound is present in said composition in a percentage by weight of from 0.1% to 50%.

117. (New) The method of Claim 43, wherein said passivated semiconductor nanoparticles, and said at least one of said first cyclic Group IVA compound and said second cyclic Group IVA compound are present in said ink in a percentage by weight of from 0.1% to 50%.

118. (New) The method of Claim 41, wherein said solvent is aprotic.

119. (New) The method of Claim 41, wherein said solvent is apolar.

120. (New) The method of Claim 118, wherein said solvent is apolar.

121. (New) The method of Claim 118, wherein said solvent has a boiling point of less than 250 °C. at atmospheric pressure.

122. (New) The method of Claim 121, wherein said solvent has a boiling point of less than 150 °C. at atmospheric pressure.

123. (New) The method of Claim 118, wherein said solvent is selected from the group consisting of alkanes, alkenes, halogenated alkanes, halogenated alkenes, arenes, substituted arenes, ethers, cyclic ethers, aliphatic esters, aliphatic amides and aliphatic sulfoxides.

124. (New) The method of Claim 41, wherein said composition further comprises one or more additives selected from the group consisting of a tension reducing agent, a surfactant, a thickening agent, and a binder.

125. (New) The method of Claim 59, wherein said sintering temperature is at least about 300 °C.

126. (New) The method of Claim 41, wherein said curing further comprises heating said cyclic Group IVA compound(s) to a temperature of at least about 100 °C. to dry the printed composition, prior to irradiating said printed composition.

127. (New) The method of Claim 126, wherein said curing step further comprises sintering said dried, irradiated composition to form said patterned semiconductor film.

128. (New) The method of Claim 41, comprising gravure printing said composition in said solvent in said pattern onto said substrate.

129. (New) The method of Claim 41, comprising printing said composition in said solvent in said pattern onto said substrate by offset lithography.

130. (New) The method of Claim 41, comprising flexographic printing said composition in said solvent in said pattern onto said substrate.

131. (New) The method of Claim 41, wherein curing is conducted under conditions sufficient to form a doped or undoped polysilane, polygermane or germanium-substituted polysilane having a molecular weight sufficiently high and/or a chemical composition sufficiently insoluble to resist subsequent treatment with processing solvents.

132. (New) The method of Claim 102, wherein at least one of the n instances of A is Ge.

133. (New) The method of Claim 98, wherein said composition further comprises a surfactant.

134. (New) The method of Claim 133, wherein the surfactant comprises a tri-C_1-C_{20} alkyl-substituted amine, a tri-C_1-C_{20} alkyl-substituted amine oxide, a tetra-C_1-C_{20} alkyl-substituted quaternary ammonium salt, a conventional betaine, a conventional sulfobetaine, a polyglycol of the formula H-(-OCH_2CH_2-)$_a$-OH (where $2 \leq a \leq 4$), a polyether of the formula R^3-(-OCH_2CH_2-)$_a$-OR^4 (where R^3 and R^4 are independently a C_1-C_4 alkyl group), a C_4-C_{20} branched or unbranched, saturated or unsaturated aliphatic carboxylic acid ester of a C_1-C_4 alcohol, a C_4-C_{20} aliphatic carboxylic acid thioester of a C_1-C_4 thiol, a tri-C_1-C_{20} alkyl- or triaryl-substituted phosphine, a tri-C_1-C_{20} alkyl- or triaryl-substituted phosphate, a di-C_1-C_{20} alkyl- or diaryl-substituted phosphate salt, an

aryl or C_4-C_{20} branched or unbranched, saturated or unsaturated aliphatic sulfonic acid, an aryl or C_4-C_{20} branched or unbranched, saturated or unsaturated aliphatic sulfonate, a di-C_1-C_{20} alkyl sulfate, a C_1-C_{20} alkyl sulfate salt, a ketone of the formula $R^5(C=O)R^6$ (where R^5 and R^6 are independently a C_1-C_{20} alkyl or C_6-C_{10} aryl group), and/or a conventional silicone.

135. (New) The method of Claim 44, wherein the silicon nanoparticles have an average diameter of less than 5 nm.

136. (New) The method of Claim 135, wherein the silicon nanoparticles have an average diameter of less than 3.5 nm.

137. (New) The method of Claim 44, wherein the silicon nanoparticles have a size distribution range such that at least 95% of the nanoparticles have an average particle diameter of from 0.1 nm to 10 nm.

138. (New) The method of Claim 137, wherein the silicon nanoparticles have a size distribution range such that at least 98% of the nanoparticles have an average particle diameter from 0.5 nm to less than 5 nm.

139. (New) The method of Claim 116, wherein the first cyclic Group IVA compound is present in the composition in a percentage by weight of from 0.5 to 30 wt.% .

140. (New) The method of Claim 139, wherein the first cyclic Group IVA compound is present in the composition in a percentage by weight of from 1.0 to 20 wt.%.

141. (New) The method of Claim 117, wherein the passivated semiconductor nanoparticles and first and/or second cyclic Group IVA compound(s) are present in the composition in a percentage by weight of from 0.5 to 30 wt.%.

142. (New) The method of Claim 117, wherein the passivated semiconductor nanoparticles and the first and/or second cyclic Group IVA compounds are present in a weight ratio of from 0.1% to 90%.

143. (New) The method of Claim 117, wherein the passivated semiconductor nanoparticles and the first and/or second cyclic Group IVA compounds are present in a weight ratio of from 10% to 50%.

144. (New) The method of Claim 41, wherein the solvent has a gas-phase dipole moment of about 2 debyes or less.

145. (New) The method of Claim 144, wherein the solvent has a boiling point of about or less than 200 °C. at atmospheric pressure.

146. (New) The method of Claim 41, wherein the solvent has a gas-phase dipole moment of about 0.5 debye or less.

147. (New) The method of Claim 146, wherein the solvent has a boiling point of about or less than 150 °C. at atmospheric pressure.

148. (New) The method of Claim 133, wherein the surfactant is present in the composition in an amount of from 0.05 wt.% to 0.5 wt.% of the composition.

149. (New) The method of Claim 124, wherein the one or more additives are present in the composition in an amount of from 0.1 wt.% to 5 wt.%.

150. (New) The method of Claim 41, wherein the substrate comprises a semiconductor wafer or a transparent or translucent display window with a two-dimensional array of fields thereon.

151. (New) The method of Claim 150, comprising inkjet printing, gravure printing, printing by offset lithography, or flexographic printing the composition in the pattern in each of the fields.

152. (New) The method of Claim 41, wherein the substrate comprises a glass or plastic window.

153. (New) The method of Claim 41, further comprising irradiating portions of the printed composition with light having a wavelength and/or intensity sufficient to oligomerize or polymerize the irradiated portions of the composition.

154. (New) The method of Claim 41, wherein the portions of the printed composition with light are irradiated sufficiently to convert irradiated cyclic Group IVA compounds to an insoluble polymer.

155. (New) The method of Claim 41, further comprising removing solvent from the printed composition prior to curing.

156. (New) The method of Claim 59, wherein said sintering temperature is at least 400 °C.

157. (New) The method of Claim 41, further comprising cleaning the substrate with the patterned semiconductor film thereon.

158. (New) The method of Claim 157, wherein cleaning comprises rinsing the substrate with or immersing the substrate in a cleaning solvent, draining the cleaning solvent from the substrate, and drying the substrate and patterned semiconductor thin film.

159. (New) The method of Claim 157, wherein the cleaning solvent comprises a solvent in which the first cyclic Group IVA compound has a high solubility.

160. (New) The method of Claim 62, wherein said lines have a width of from 1 μm to 20 μm.

161. (New) The method of Claim 63, wherein said inter-line spacing is from 200 nm to 50 μm.

162. (New) The method of Claim 161, wherein said inter-line spacing is from 500 nm to 10 μm.

163. (New) The method of Claim 64, wherein said lines have a length of from 5 μm to 1000 μm.

164. (New) The method of Claim 65, wherein said lines have a thickness of from 0.05 μm to 250 μm.